

Mass migration of *Kricogonia lyside* (Lepidoptera, Pieridae) in Santo Domingo, Dominican Republic, in 1995

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Abstract Mass migration of *Kricogonia lyside* (Pieridae) was observed in Santo Domingo, Dominican Republic, on September 16-17, 1995. According to my calculation, more than a million *K. lyside* moved from west to east for two days. The migration accompanied four other species: *Phoebis sennae* (Pieridae), *Euptoieta hegesia*, *Euptoieta claudia* (Nymphalidae) and *Agraulis vanillae* (Heliconiidae).

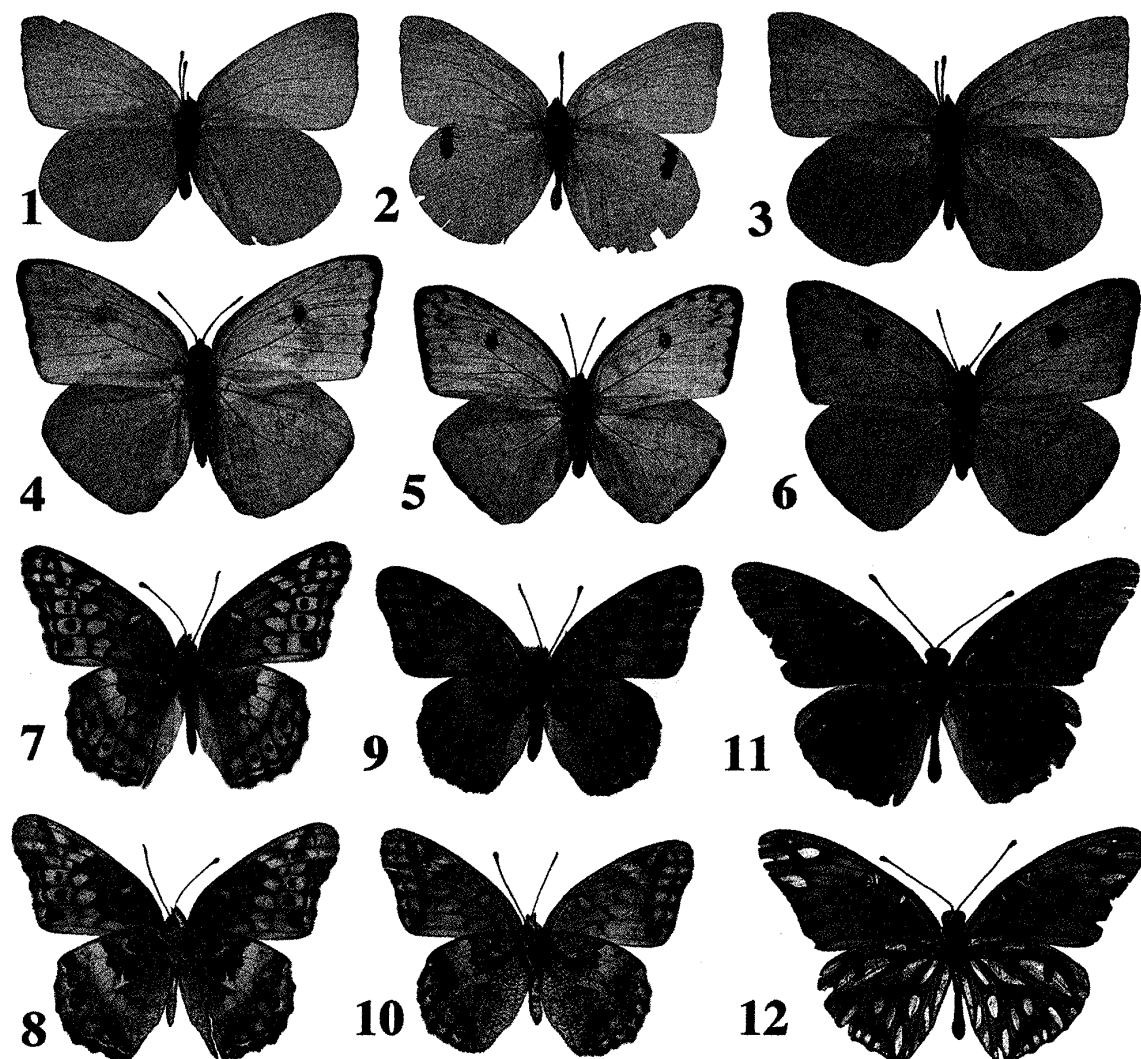
Key words Migration, butterflies, *Kricogonia lyside*, *Phoebis sennae*, *Euptoieta hegesia*, *Euptoieta claudia*, *Agraulis vanillae*, Santo Domingo, Dominican Republic, Caribbean Islands.

The famous Spanish historian, Fray Bartromé Las Casas observed the migration of butterflies in Cuba in 1520. He wrote that "a large crowd of butterflies flew towards the fleet of vessels on the sea, so that it seemed as if covered by clouds". However he did not leave any clue such as their wing color and size for identification of the butterflies. His observation is the first record of the migration of butterflies in the Caribbean Islands. After that, I believe many people observed the same phenomenon in the islands, and probably some of them published their observations, but it is very difficult for me to discover literature published in the area.

Fortunately, I observed the mass migration of *Kricogonia lyside* (Pieridae) (Figs 1-2) in Santo Domingo, Dominican Republic (Figs 13-14), on September 16-17, 1995. According to Williams (1958), several authors recorded the migration of this species in Mexico and Texas. It is distributed on the Caribbean Islands west from Puerto Rico, but as far as I know there is no record of mass migration in the area. For example, Schwartz (1989) and Smith *et al.* (1994) did not mention migration of *K. lyside*, though they had much experience on the butterflies in these islands for a long time. Therefore, the migration of *K. lyside* in this area may be very rare. During my stay of two years in Santo Domingo, I also did not encounter mass migration of a million individuals of butterflies except in the present case.

I describe herein my observation on the mass migration of *K. lyside* in Santo Domingo. In the migration, *K. lyside* moved from west to east with other four butterfly species (Figs 3-12). On the first day (September 16), when I was driving my car on Abraham Lincoln Avenue, Santo Domingo, heading south to Ciudad Colonial at about 9 o'clock in the morning, I saw many white butterflies with some yellow ones flying off in an easterly direction. Their number increased gradually with time, and eventually they were flying off from west to east continuously.

At first, yellow butterflies were seen near my house, but when I approached Abraham Lincoln Avenue which runs from north to south, white butterflies became predominant and were crossing the avenue and flying over the road-side buildings toward the east. In the streets running east and west, such as "27 de Febrero" and "George Washington" Avenues, the



Figs 1-12. All butterfly specimens collected in Santo Domingo on September 17, 1995. 1-2. *Kricogonia lyside* (Pieridae) (male). 3-6. *Phoebis sennae* (Pieridae) (3: male, 4-6: female). 7-8. *Euptoieta claudia* (Nymphalidae) (male). 9-10. *Euptoieta hegesia* (Nymphalidae) (male). 11-12. *Agraulis vanillae* (Heliconiidae) (male).

butterflies were usually flying about 2-3 meters above the surface in parallel with the street. Therefore many individuals were hit by cars and their wings were dispersed on the road like petals of white flowers. Along the coastal road, G. Washington Avenue, many butterflies were also observed, but they never flew on the sea, but always returned to the land from the sea shore. Outside the high wall of the Ciudad (× in the map of Santo Domingo, Fig. 14), which faces toward the coastal road and the sea, many white butterflies gathered and went over the wall. However, there were not many white butterflies inside the wall at Ciudad Colonial.

The range of the migration, extending from north to south, was estimated to cover at least several kilometers. The peak of migration was about noon, and the number of butterflies gradually decreased from afternoon to evening. The weather condition of the day was very fine, and remained almost calm and windless until evening.

On the second day (September 17) at about 9 o'clock in the morning, when I looked south

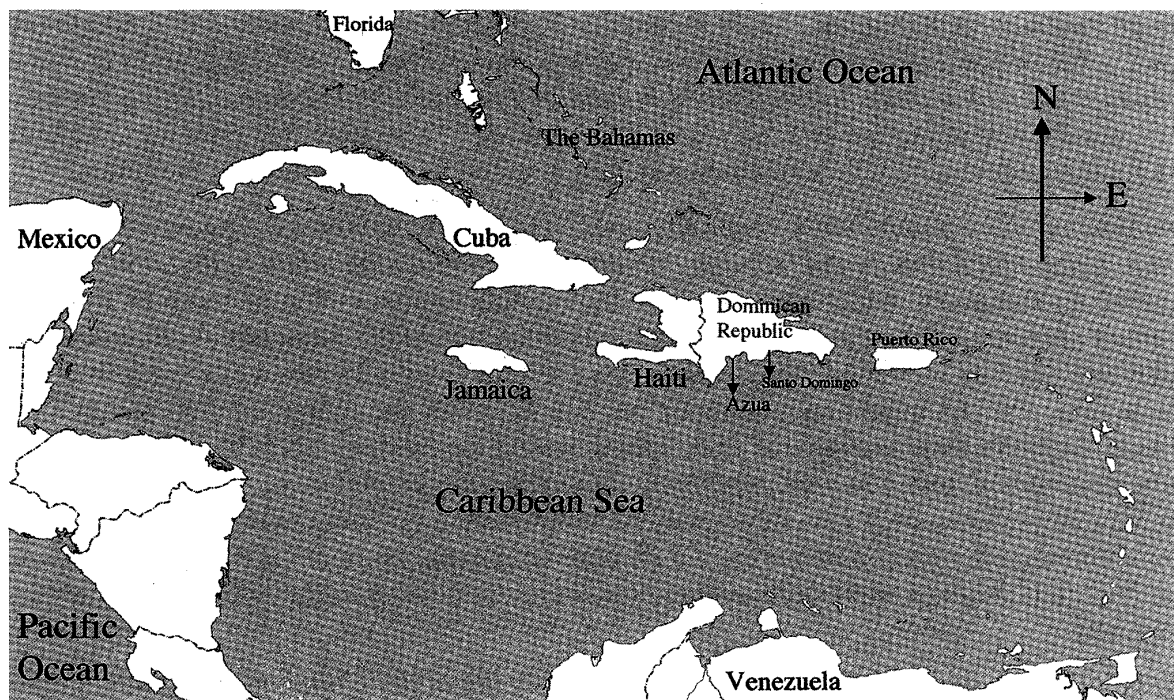


Fig. 13. Map of Caribbean Islands.



Fig. 14. Map of Santo Domingo.

from my house window, the migration of the white butterfly had already begun. I counted the numbers of the butterfly which passed a range between the window and the building of Plaza Central, which is south and about 100 meters in distance. Two hundred individuals

passed the area in 8 minutes. This means 25 individuals for 1 minute, and 1,500 for one hour. All of them flew off from west to east without exception. The migration continued at least until two o'clock in the afternoon, and at that time the number of flying butterflies for 1 minute was about the same as that in the morning. Therefore it is possible to calculate the total number of 7,500 individuals passing the range of 100 meters for five hours.

I walked north and south with a butterfly net to confirm the width of the migration (Fig. 14). I saw many butterflies at the John F. Kennedy Avenue in the north and G. Washington Avenue in the south, which is limited by the Caribbean Sea. The distance of those two avenues is about 3,700 meters. I could not go farther north of J. Kennedy Avenue, but I can safely say that the migration range must extend several more kilometers to the north beyond the avenue. If the migration continued for five hours in the range of 3,700 meters in the second day, the total number of individuals would amount to 277,500. The number of butterflies on the first day was apparently more than the second day. Therefore, the total number of butterflies for two days must be more than a million individuals. About two o'clock in the afternoon, I drove my car to observe the migration at G. Washington Avenue, but after that time the wind became slightly stronger, and the number of butterflies decreased gradually.

Mr N. Nakajima kindly informed me that the migration of the white butterflies was observed in Azua (Fig. 13), about 120 kilometers from Santo Domingo, on September 16. They were flying toward the direction of Santo Domingo. If this migration belonged to the same group of the migration in Santo Domingo, the butterfly number must exceed several millions. However, I do not know the final destination of the migration.

I did not carry a butterfly net on the first day, but the next day, I collected several specimens to identify the species. The white one is *Kricogonia lyside* (Figs 1-2), which is the main component of the migration. After that, the yellow butterfly, *Phoebis sennae* (Pieridae) (Figs 3-6) was flying off in the same direction with *K. lyside*. According to my estimation, the number of *P. sennae* is about 5% of *K. lyside*. Furthermore the migration was apparently accompanied by three other butterfly species: *Euptoieta claudia* (Figs 7-8) and *Euptoieta hegesia* (Figs 9-10) (Nymphalidae) and *Agraulis vanillae* (Heliconiidae) (Figs 11-12). These three species are not many in number, but apparently they were flying off toward the east with *K. lyside*.

In the local area near Azua, I often observed many individuals of *P. sennae* flying off from west to east along the road. However I could not determine whether it was real migration, *i. e.*, flying off in one direction and not returning to the starting place, or only flying away in one direction in the morning, then returning in the afternoon to the original place.

I believe that *P. sennae* has a habit of migration, because several times from my house window in Santo Domingo I observed them at noon time flying from west to east, one by one for two or three hours. In these cases, the number of butterflies was not many, possibly less than 5 individuals in 1 minute. I never observed returning flight from east to west from my window. Williams (1958) also recorded *P. sennae* and *Agraulis vanillae* as migrant butterflies in southern United States.

My observation is very limited geographically, because I could not investigate the real range of the migration and also their destination. However I believe that it is very interesting behavior to record.

Finally, I express my deepest appreciation to Prof. H. S. Yong, University of Malaya, for his

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摘 要

ドミニカ共和国サント・ドミンゴ市で観察したクリコゴニアシロチョウの大移動 (宮田 彬)

1995年9月16日と17日の2日間にわたって、ドミニカ共和国サント・ドミンゴ市でシロチョウ科のクリコゴニアシロチョウ, *Kricogonia lyside* の西から東へ向かう大移動に遭遇した。その規模は実際に確認しただけでも南北に幅 3.7 km にわたる蝶の帯が、2日間にわたって少なくとも合計 10 時間以上東へ向かって動いていた。初日はゆっくり観察する時間を取ることが出来なかったが、午前 9 時にはすでに移動が始まっており、午後遅くまで続いていた。蝶の大移動は海岸と平行して走っているワシントン通りを東へ約 4 km 先の旧市街 (Ciudad Colonial) までたどることが出来た。その先まで行くことが出来なかったが、もっと先まで続いていたことは間違いない。

2日目の9月17日午前9時、3階の自宅の窓から南側を見ると白い蝶がまた西から東へ次々と飛んで行った。幸い3階の窓から見ると南側約 100 m 先のショッピング・センター“プラザ・セントラル”の建物までは2階建てのビルの屋上になっておりまったく障害物がなかった。それでその間を通過する蝶の数を数えたところ1分間に25個体であった。南北の幅を調べるために歩いて出かけ、少なくともほぼ東西に走っているケネディ通りとワシントン通りの間 (約 3.7 km) は蝶が続々と移動していることが分かった。ケネディ通りより先へは行かず引き返した。途中で捕らえた蝶は5種でいずれも移動に参加しており、どの蝶も狂ったように東へ東へ向かっていった。

白い蝶はシロチョウ科のクリコゴニアシロチョウ, *Kricogonia lyside* で、この蝶は上述のように 100 m 幅を 1 分間 25 個体通過した。2日目だけでも幅 3.7 km の移動が 5 時間継続したとすると、移動した蝶の数は 277,500 に達する。この状態が 2 日間で合計 10 時間続いたと仮定すると蝶の数は約 55 万頭という膨大な数である。しかも飛来が続いた時間は実際にはもっと長く、個体数も初日の方がはるかに多かった。またケネディ通りのさらに北まで蝶が広がっていたことは間違いないので、実際に移動したクリコゴニアシロチョウの個体数は、百万あるいは二百万という驚くべき数に達したことになる。なお初日の移動は、JICA 事務所の中島伸克所長によれば 120 km 離れたアスアでも見られたという。その時も蝶は東方向へ向かって飛び続けていたという。もしその移動とサント・ドミンゴ市で 2 日間続いた移動が同一グループの蝶であったとすると、参加した蝶の数は数百万に達することになる。なお移動が続いた 2 日間は晴天で、ほとんど無風であった。

2 番目に個体数が多かったのはシロチョウ科のフォエビス・センナエ, *Phoebis sennae* で、大ざっぱな見積もりであるが、クリコゴニアシロチョウの数の 5% 程度の個体数が移動したと推定された。また個体数は多くなかったが、時々タテハチョウ科のオイブトイエタ・クラウディア, *Euptoieta claudia* やオイブトイエタ・ヘゲシア, *Euptoieta hegesia* や、ドクチョウ科のヴァニラエウラギンドクチョウ, *Agraulis vanillae* も、やはりクリコゴニアシロチョウと同じく東へ向かって飛んでいた。以上 3 種は市街地でも緑地があれば見られる蝶ではあるが、ふだんは道路上を東へ東へ飛んで行くようなことはないで、やはり移動していたとしか考えようがない。

なおフォエビス・センナエは 9-10 月に郊外の道を車で走ると多数の個体が、次々と車の窓にぶつかって来るので、あたかも移動しているように見える。しかしこの現象は郊外から市街地へ入ると急に蝶

が姿を消すので、真の移動とは考えられない。

しかし私はドミニカ産のフォエビス・センナエの場合は、確かに移動している場合もあるのではないかと考えている。なぜなら昼食に都会の真ん中のわが家へ帰って窓の外を見てみると、この蝶も時々、東へ向かって次々と飛び去って行くのが見られるからだ。田舎で道路に沿って飛んでくるこの蝶に出会うのはよくあることなのだが、我が家から眺められる移動はいつも見られるわけではなく、またこの蝶の生息環境とはあまり関係がなさそうな市街地での現象であり、移動性の蝶であることは間違いないと思う。しかしその場合も多い目に見積もっても、この蝶の個体数は1分間に5頭以下であった。

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